

SOIL MOVEMENT CALCULATION AND SOIL EROSION AND SEDIMENT CONTROL PLAN

Two-Story Gambrel Garage Addition

Response to Board Engineer Review Comments

Project Information

Property Address:	15 Alan Street, West Orange, NJ
Block / Lot:	Block 146, Lot 72
Zone:	R-T
Project:	Two-story gambrel garage addition (8' × 18.5' new foundation footprint, attached to existing foundation plus 3 footers cut into existing foundation)
Applicant:	Max Grossman, Homeowner
Engineer of Record:	Yogi Engineering (structural drawings only)
Date:	May 4, 2026

Purpose

This document is submitted in response to Board Engineer review comments 5.9 and 5.10. It provides:

- A soil movement calculation for the proposed improvements within the limit of disturbance, demonstrating that total soil to be moved is well below the 300 CY threshold that would require a separate soil removal permit (addresses Comment 5.10);
- A Soil Erosion and Sediment Control Plan, including the area of disturbance and the control measures to be installed and maintained for the duration of construction (addresses Comment 5.9).

Both items have been prepared by the homeowner / contractor of record. The structural engineer of record (Yogi Engineering) has confirmed that soil movement quantity calculations and soil erosion control plans fall outside their structural scope of work.

Scope of Excavation

The new foundation will be constructed adjacent to and tied into the existing foundation. The new excavation footprint is 8'-0" × 18'-6". Excavation includes the following components:

- Removal of existing asphalt driveway and stone base course over the new foundation footprint
- Wall footing trench excavation along three sides of the new foundation (the fourth side ties into the existing foundation)

- Pad footing excavations for one each of footings F2.0, F2.5, F4.0, and F4.5 per the structural drawings
- Slab field excavation to subgrade elevation to allow for compacted stone base, vapor barrier, and concrete slab

Design Assumptions

Parameter	Value / Basis
Frost depth	36" below finished grade (NJ / Essex County standard)
Wall footing dimensions	2'-0" wide × 1'-0" thick (per Wall Footing Schedule)
Stem wall	8" CMU on top of wall footing, up to grade
Working room (over-dig)	1'-0" each side of footing for forming and access
Existing asphalt thickness	2" (field-measured)
Existing stone base	Approx. 4"–6" (to be field-verified at excavation)
Slab buildup	4" compacted stone + vapor barrier + 4" concrete slab

Part A. Soil Movement Calculation (Comment 5.10)

Excavation Volume Calculation

1. Wall Footing Trench

Three sides of new foundation: $8' + 18.5' + 8' = 34.5$ linear feet

Trench width: 2' (footing) + 1' working room each side = 4'

Excavation depth to bottom of footing: 3'-0" (frost depth)

Volume: $34.5 \text{ LF} \times 4 \text{ ft} \times 3 \text{ ft} = 414$ cubic feet

2. Pad Footings

Each pad footing is dug as a square hole sized to the footing plus 1' working room on each side, to a depth of 3'-0".

Mark	Footing Size	Excavation Plan	Depth	Volume (CF)
F2.0	2' × 2'	4' × 4'	3'	48
F2.5	2' × 2'	4' × 4'	3'	48
F4.0	4' × 4'	6' × 6'	3'	108
F4.5	4'-6" × 4'-6"	6'-6" × 6'-6"	3'	127

Subtotal				331 CF
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3. Slab Field Excavation

After removing the existing 2" asphalt and approximately 4"–6" of stone base, additional soil excavation is required to reach subgrade elevation 8" below the finished slab. Net additional soil excavation in the slab field is conservatively estimated as follows:

Footprint: $8' \times 18.5' = 148 \text{ SF}$

Net additional depth below existing stone base: approximately 4"

Volume: $148 \text{ SF} \times (4/12) \text{ ft} = 49 \text{ cubic feet}$

4. Total Soil Volume (Bank Measure)

Component	Volume
Wall footing trench	414 CF
Pad footings (F2.0, F2.5, F4.0, F4.5)	331 CF
Slab field (additional soil below existing base)	49 CF
Total (bank measure)	794 CF $\approx$ 29.4 CY
Total with 25% swell factor (loose measure for hauling)	$\approx$ 36.8 CY

Asphalt and Stone Removal (Reported Separately)

The following materials are removed from the site but are not soil and are reported separately for completeness:

- Asphalt: $148 \text{ SF} \times 2" \text{ thick} = \text{approximately } 25 \text{ CF} (\approx 0.9 \text{ CY})$. Disposed of via construction debris dumpster.
- Existing stone base: $148 \text{ SF} \times \text{approximately } 5" = \text{approximately } 62 \text{ CF} (\approx 2.3 \text{ CY})$. Where clean and free of fines, this material will be stockpiled on site and reused as compacted base under the new slab and as backfill against the new stem wall, reducing material brought onto the site.

Summary and Comparison to Permit Threshold

Total soil to be removed (bank measure)	$\approx$ 29.4 CY
West Orange soil removal permit threshold	300 CY
Percentage of threshold	$\approx$ 9.8%

The total proposed soil removal is approximately 29.4 cubic yards (bank measure), or approximately 36.8 cubic yards accounting for swell during hauling. Both figures are well below the 300 cubic yard threshold that would trigger a separate soil removal permit. No separate soil removal permit is therefore required for this project.

Part B. Soil Erosion and Sediment Control Plan (Comment 5.9)

Limit and Area of Disturbance

The limit of disturbance is confined to the immediate area of the new garage addition and the working area required for foundation excavation, equipment staging, and material stockpile. The area of disturbance is calculated as follows:

Component	Area
New foundation footprint (8' × 18.5')	148 SF
Excavation working area around foundation (5' perimeter)	Approx. 365 SF
Equipment staging and stockpile area	Approx. 400 SF
Total area of disturbance	Approx. 913 SF

The total area of disturbance is approximately 913 SF, well below the 5,000 SF threshold cited in Comment 6.1.1 that would require Hudson-Essex-Passaic Soil Conservation District certification. The limit of disturbance has been updated on the site plan

Part B: Site Conditions and response to section 5.8

The work area consists of an existing asphalt driveway and adjoining maintained lawn immediately adjacent to the existing garage and foundation. The slope across the work area is gentle with a maximum slope of 7.55%, as the area is already graded to serve the existing garage and driveway. There are no streams, wetlands, or storm drain inlets within or immediately adjacent to the limit of disturbance.

Methodology: A laser level was placed at the northwest corner of the proposed expansion site as it is the point of highest grade. Measurements were then taken at each corner of the proposed foundation to determine slope in both directions. The following measurements were recorded:

Location	Measurement below NW Corner
NW corner (against existing garage)	0" (origin point)
NE corner (against existing garage)	-1.25"
SW corner (8' south of existing garage)	-3.875"
SE corner (8' south of existing garage)	-8.5"

East-West slope (along the 18.5' / 222" length):

- North side: NW (0") to NE (-1.25") = 1.25" fall over 222" = **0.56%**
- South side: SW (-3.875") to SE (-8.5") = 4.625" fall over 222" = **2.08%**

North-South slope (along the 8' / 96" width):

- West side: NW (0") to SW (-3.875") = 3.875" fall over 96" = **4.04%**
- East side: NE (-1.25") to SE (-8.5") = 7.25" fall over 96" = **7.55%**

Diagonal (corner-to-corner):

- NW to SE = 8.5" fall over the diagonal distance of $\sqrt{(222^2 + 96^2)} = 242" \rightarrow$ **3.51%**

Part C: Erosion and Sediment Control Measures

The following measures will be installed prior to the start of any earth-disturbing activity and will be maintained continuously until the disturbed ground is permanently stabilized, in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey:

- Silt fence: Installed along the down-gradient perimeter of the limit of disturbance. Inspected weekly and after each rainfall event of 0.5" or greater. Accumulated sediment removed when it reaches one-third of fence height. Sand bags can be placed along the undisturbed portion of the driveway to prevent runoff in that direction.
- Inlet protection: The nearest storm drain inlet in the public right-of-way will be protected with a filter fabric inlet sack or equivalent for the duration of the project.
- Soil stockpile management: Excavated soil temporarily stockpiled on site will be located inside the silt fence and bag perimeter on the remaining driveway and kept away from any drainage path. It will remain covered with a tarp.
- Dust control: Exposed soil and stockpiles will be wetted as needed during dry, windy conditions to control dust.
- Daily site management: At the end of each work day, the construction entrance and adjacent street will be inspected and any tracked-out material swept and removed.

Sequence of Construction

- Install silt fence and bags, and inlet protection prior to any other site work.
- Subcontractor will:
 - Saw-cut and remove existing asphalt and stone base within the new foundation footprint.
 - Excavate footing trenches and pad footings; stockpile soil within silt fence perimeter.
 - Form, place reinforcing, and pour footings; build stem wall.
 - Backfill against stem wall using clean stockpiled material; place compacted stone base under slab.
 - Pour slab. Proceed with framing per approved structural drawings.
 - Restore all disturbed areas: regrade, topsoil (4" minimum), and seed within 7 days of final grading.
- Maintain erosion control measures until vegetation is fully established (typically 70% uniform cover). Remove temporary measures only after permanent stabilization is achieved.

Permanent Stabilization

All disturbed areas not occupied by the new structure or hardscape will be restored with 4" minimum of topsoil and seeded with a turf grass mix appropriate for the site, consistent with Comment 5.13. A note to this effect will be added to the site plan.

Part D: Roof Leader Plan and Discharge (Comments 5.5 and 5.7)

Existing roof drainage system

The existing dwelling is served by an underground roof drain system constructed of approximately 3" PVC pipe. The system collects roof runoff from the existing downspouts and conveys it underground along the southeast side of the house (along the property boundary between 15 Alan and 13 Alan), running approximately the full 120' length of the property to a discharge point at the curb in the public right-of-way at the front of the property. (The 120' length includes approximately 5'–6' of municipally-owned sidewalk and grass strip between the front property line and the street.) The system has functioned without backup, surfacing, or basement infiltration throughout the current ownership of the property.

The existing system was not installed under permit in the current owner's tenure and as-built drawings are not available. Pipe size, depth, slope, and exact alignment have not been field-verified beyond what is visible at the downspout connections and the curb discharge. The system has performed reliably for many years, which is the basis for the Applicant's intent to tie the new rear leader into the existing line.

Proposed roof leaders for new garage addition

The proposed addition will have two roof leaders, one at the front (south) and one at the rear (north) of the new structure, in the same configuration and locations as the existing leaders on the existing garage.

Rear (north) roof leader: The new downspout will tie into the existing underground 3" PVC roof drain system at grade via a standard downspout-to-pipe adapter, matching the existing detail. The roof area added by the new structure is modest relative to the total existing roof area served by the system, and the existing 3" PVC main is expected to have adequate capacity to accept the additional flow. If, during construction, the existing system is determined to be inadequate or in poor condition, a separate dedicated 3" PVC line will be installed parallel to the existing line. Final discharge in either case will be at the existing curb outlet at the street.

Front (south) roof leader: The new downspout will be installed in the same location and connected in the same manner as the existing rear roof leader on the existing garage. Discharge will be at grade onto the existing asphalt driveway via a splash block, matching the existing condition. The driveway falls generally toward the lawn to the east and south toward the curb at the street. Sheet flow from the rear leader follows this existing drainage pattern, with the majority of the discharge infiltrating into the adjoining lawn and the remainder continuing south along the driveway to the curb. No underground piping is proposed for the front leader.

Effect on adjoining property owners (Comment 5.7)

The rear leader discharges to the public right-of-way via the existing curb outlet. This is the same point of discharge currently used by the dwelling and represents no new or relocated point of discharge. There is no flow path from the front leader toward any adjoining property.

The front leader discharges at grade onto the existing asphalt driveway in the same location and manner as the existing rear leader on the existing garage. The driveway falls toward the lawn

(east) and south toward the curb at the street. The proposed leader does not redirect, concentrate, or increase flow toward 13 Alan or any other adjoining property.

The existing drainage pattern across the subject driveway has functioned in this configuration for many years and accommodates not only roof runoff from the existing structures but also surface runoff from the driveway and garage on 60 Valley Way, which discharges through a 3" pvc pipe onto the subject driveway and conveys to the curb via the same pattern described above. The proposed addition does not alter this established drainage pattern in any material respect.

Summary of roof leader information

Leader	Material	Approx. Size	Approx. Length	Slope	Point of Discharge
Rear (north)	New downspout tied into existing underground PVC	3" PVC main	Approx. 120' from front of new addition to curb (existing line)	Existing system; not field-verified	Existing curb outlet at street
Front (south)	Aluminum downspout to splash block	Standard residential downspout	At grade; no underground run	At grade discharge	Onto existing asphalt driveway, sheet flow toward lawn (west) and curb (south)

General Notes

- Quantities are calculated using neat-line dimensions plus a 1' working allowance around footings. Actual field quantities may vary slightly based on soil conditions and excavator practice.
- Existing stone base depth will be field-verified at the start of excavation. If actual depth materially differs from the assumption used, this calculation will be revised and resubmitted in the extremely unlikely event that it exceeds 300 cubic yards of soil removal.
- Excavated soil will be hauled off site by a licensed hauler. Receipts will be retained and made available to the township upon request.
- Stone reused on site will be screened of any asphalt fragments and organics prior to placement under the slab.
- This calculation covers earth material removal only. Structural design of footings, foundation walls, and slab is per drawings prepared and sealed by Yogi Engineering.

Prepared by:



Max Grossman, Homeowner

Date: 5/6/26